

FRESNEL Lens Gamma Ray Telescope

Mechanical

Dave Peters

George Roach

January 10, 2002

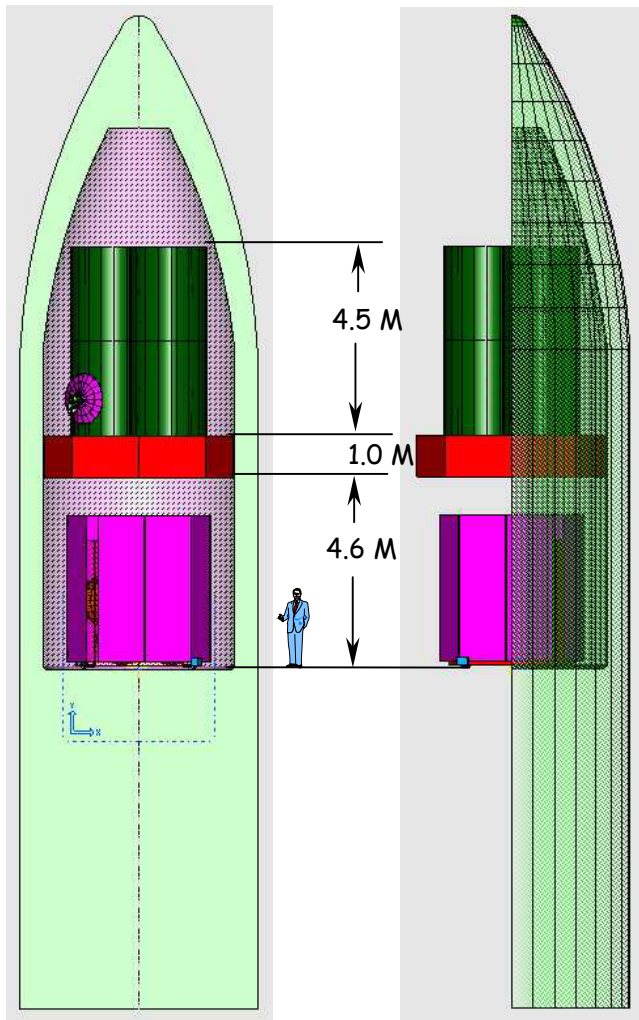


"An education isn't how much you have committed to memory, or even how much you know. It's being able to differentiate between what you do know and what you don't. It's knowing where to go to find out what you need to know; and it's knowing how to use the information you get."

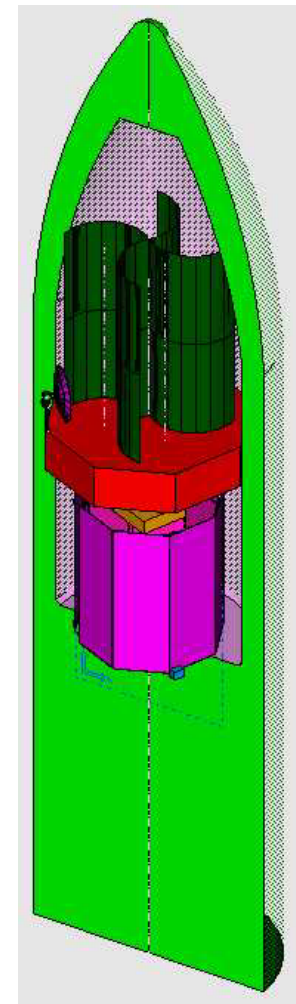
William Feather



Launch Configuration - Atlas 551

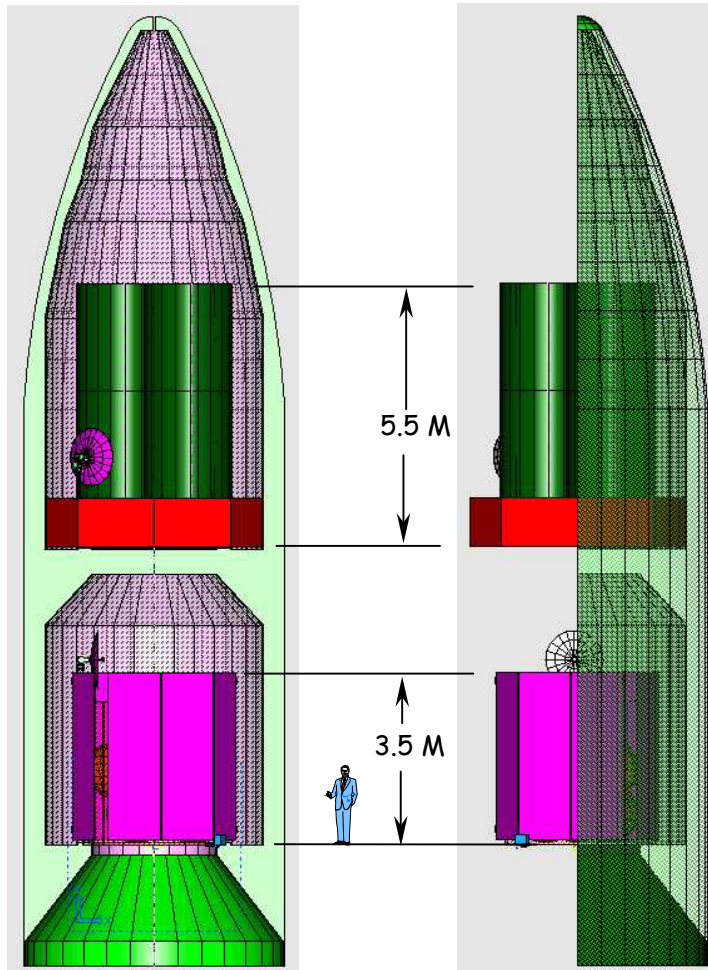


ATLAS V 5m Medium Fairing





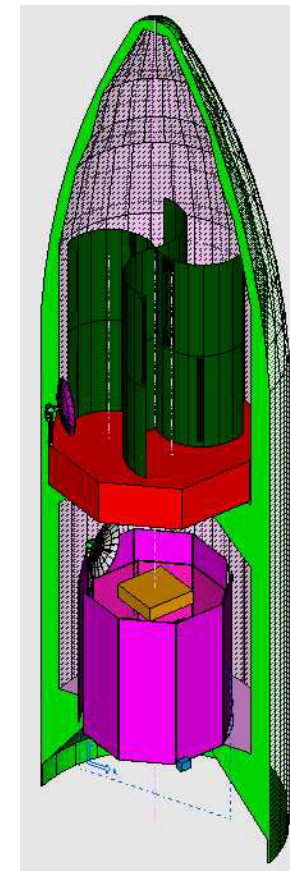
Launch Configuration - Ariane 5



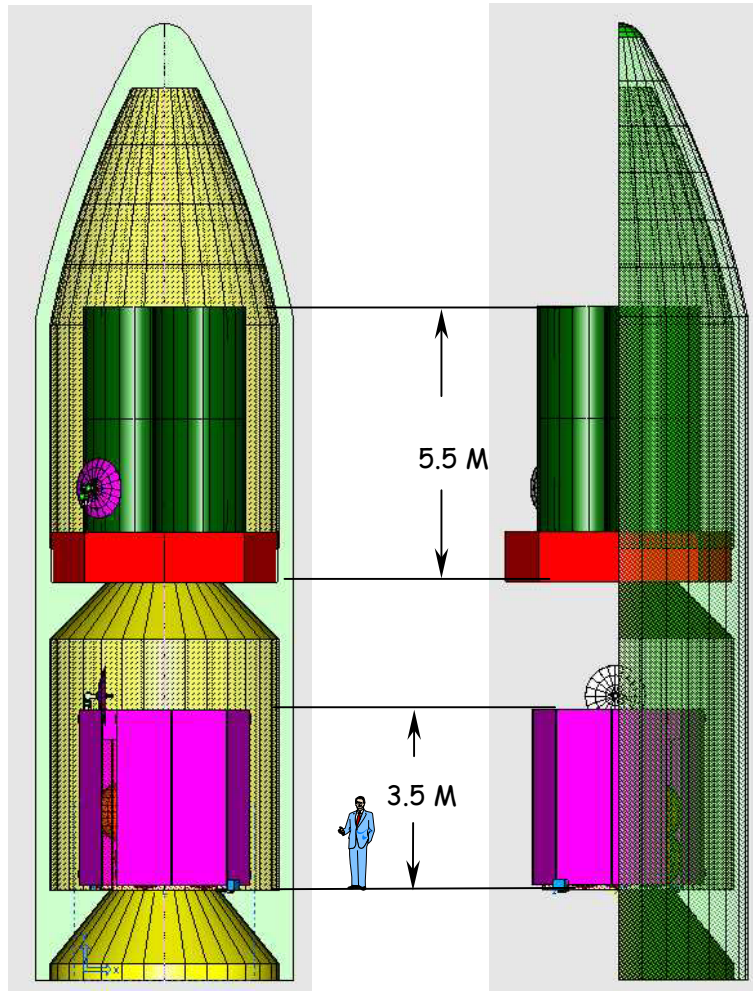
Ariane V

Interface 2624

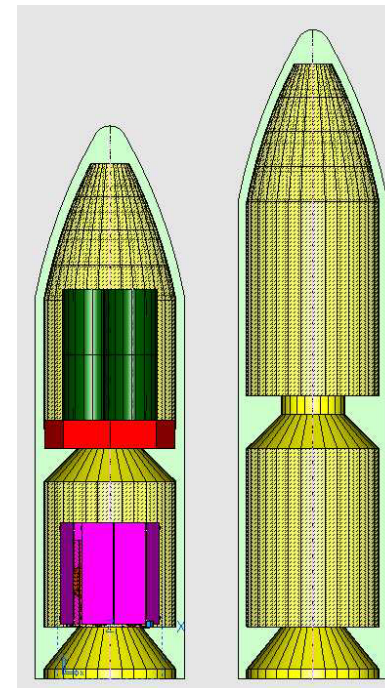
Usable Volumes Beneath Short Fairing and SPELTRA



Launch Configuration - Delta 4

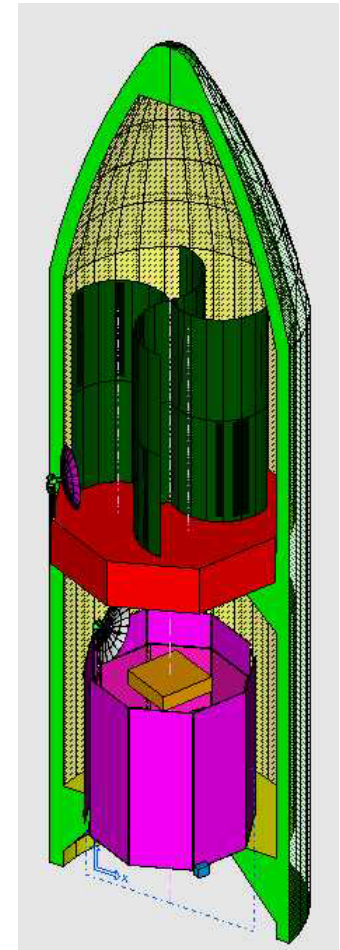


Delta IV
Dual Launch
Ø 5M x 19.1 M

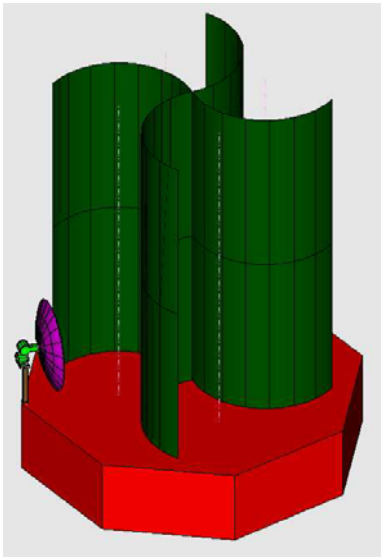


19.1

22.4



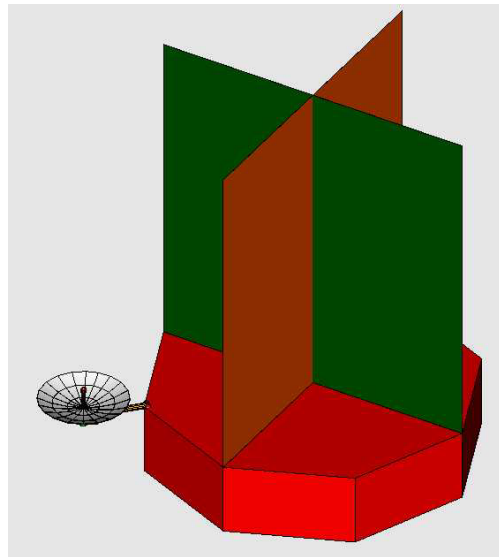
Deployed Configuration



STOWED

- SC Bus Ø4.5M octagon x 1.0 M
- 2 alaly FRESNEL lens 4.5 M x 4.5 M
- Each lens is approximately 0.85 mm thick

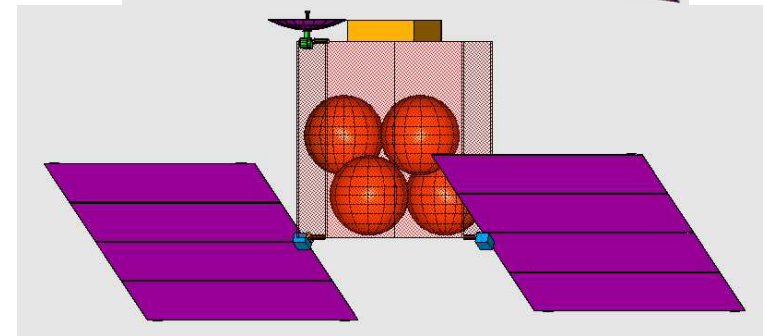
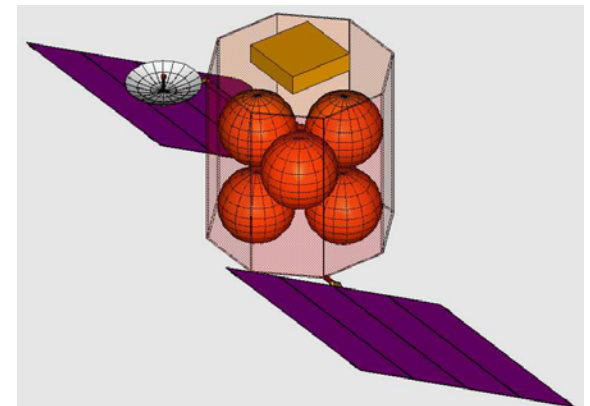
Lens Craft_{er}



DEPLOYED

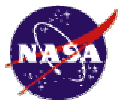
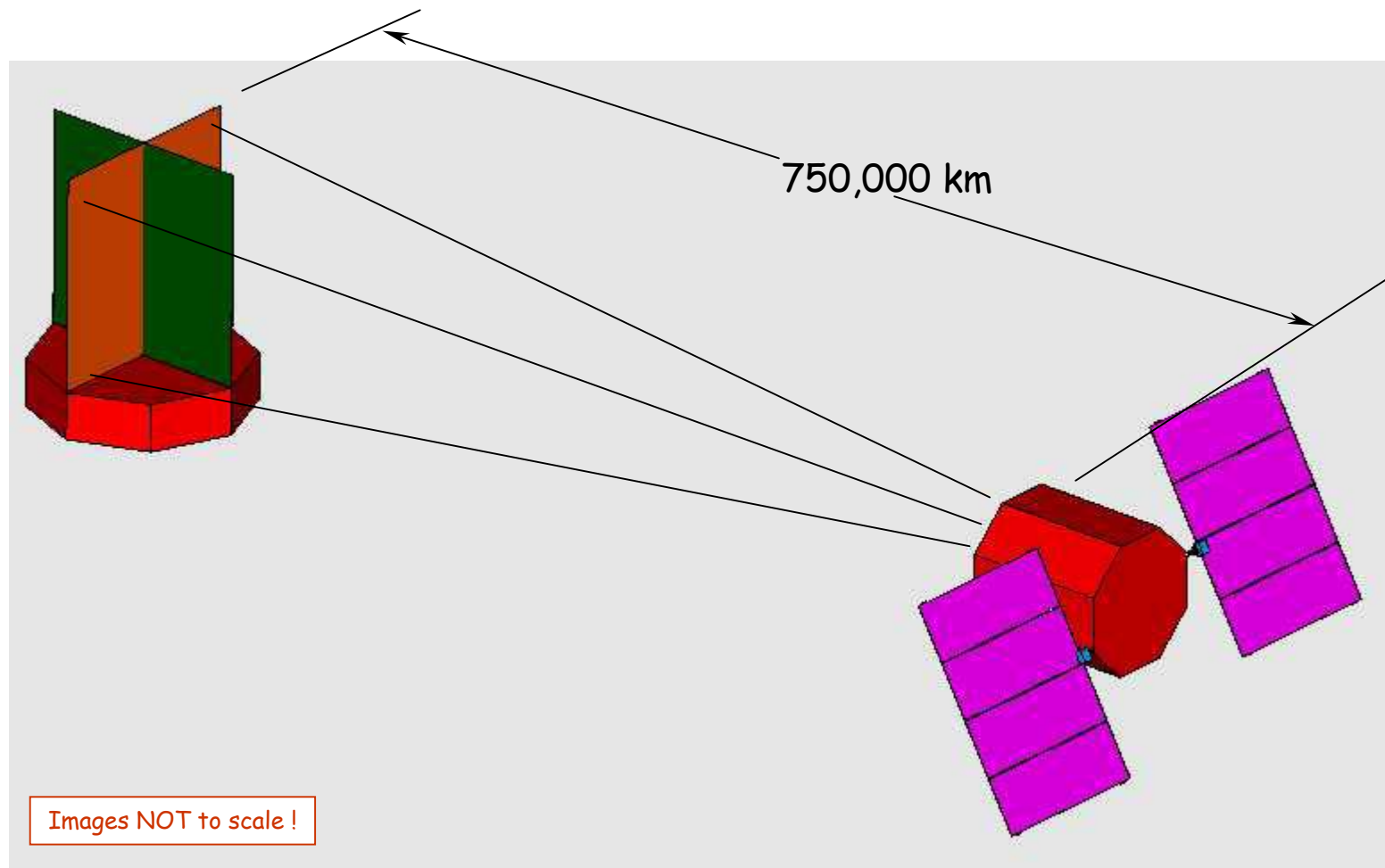
Detector Craft

- SC Bus Ø3.0M octagon x 3.0 M
- Detector 1.1 M x 1.1 M x .32 M
- 32 M² solar array, fully articulated
- Propulsion - 6000 kg in 6 Ø1.22M tanks



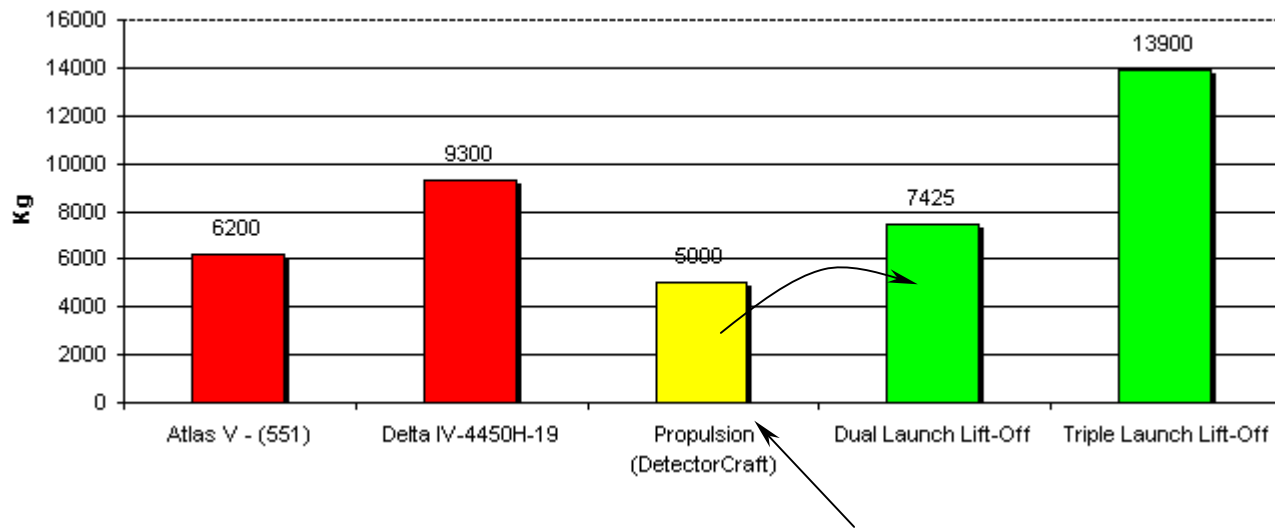


On-orbit Configuration





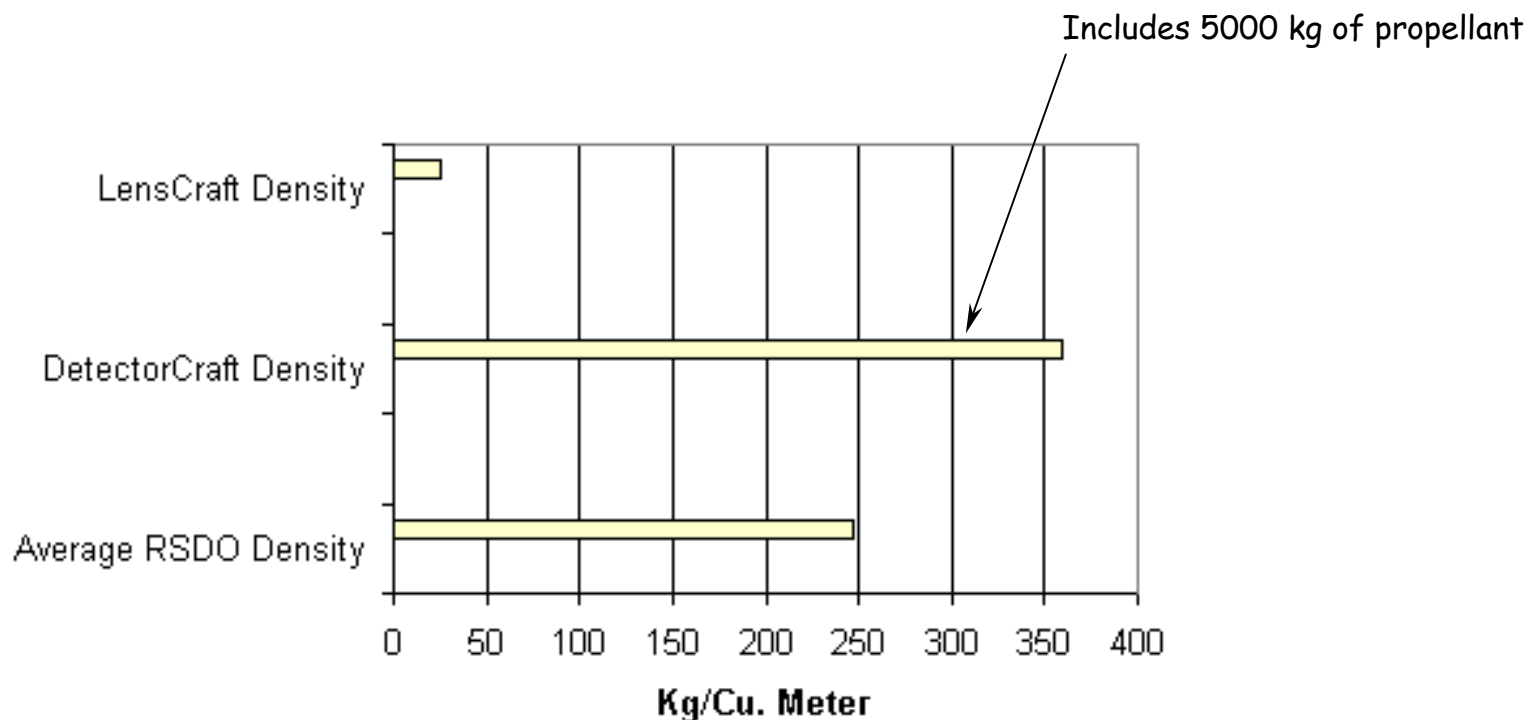
Launch Vehicle Lift-Off Capacity



Note! This shows the portion of the dual launch that is needed for the propellant



Spacecraft Bus Density Comparisons



Note! The DetectorCraft density is consider high normal. This density is due to the extreme amount of propellant necessary for this mission. This bus could be enlarge if necessary at a small mass penatly



Comments to Proposed Feasibility Study

♦ Launch Vehicles

- Volume is not a problem in any of the considered launch vehicles
- Mass will be the main issue in selecting the launch vehicle
- The mass of propulsion is very high and driving the choice of launch vehicle
- Consider multiple launches, don't "put all you eggs in one basket"

♦ S/C Bus

- Lens Craft
 - Volume for a "dumb" S/C is more than adequate to enclose all subsystem components
 - An instrument study in the ISAL could reduce the volume of the instrument "stowed". This could allow different choices of launch vehicles
- Detector Craft
 - Volume is a concern with the amount of propulsion needed for this mission
 - The size of this bus is being driven by the amount of propulsion

